Alg. 2 Warm Up # 7-2 Solve:

1. $2^{3x} = \left(\frac{1}{16}\right)^{3x - 5}$

2. $2 \log_7 3 = \log_7(x+1) + \log_7(x-1)$

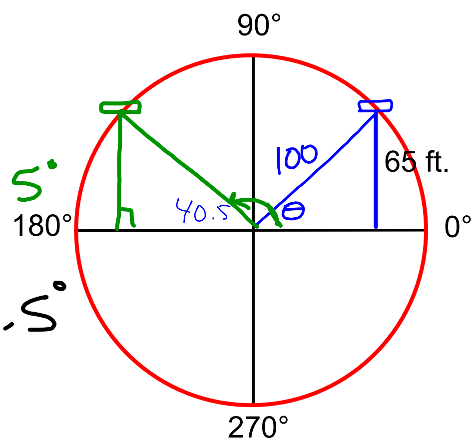
3. Solve by completing the square.

   $3x^2 + 6x - 11 = 0$

Homework Questions:

7-24. What is the domain of the entire graph of $h(\theta) = \sin\theta$? Justify your reasoning.

7-25. Antonio's friend Jessica was also on *The Screamer* when it broke. Her seat was 65 feet above the ground. What was her seat's angle of rotation? Is there more than one possibility?



or

$\theta \approx 139.5°$

$180° - 40.5°$

$\sin\theta = \frac{65}{100}$

$\theta = \sin^{-1}(0.65)$

$\theta \approx 40.5°$

7-26. Hilda was working on her homework. She completed the square to change $y = 3x^2 - 24x + 55$ to graphing form in order to identify the vertex of the parabola. She did the work at right and identified the vertex to be $(4, 39)$. When she got back to class and checked her answers, she discovered that the vertex she found is incorrect, but she cannot find her mistake. Examine Hilda's work and explain to her what she did wrong. Then show her how to complete the square correctly and identify the vertex.

$$y = 3x^2 - 24x + 55$$
$$y = 3(x^2 - 8x) + 55 \quad -48$$
$$y = 3(x^2 - 8x + 16) + 55 - 16$$
$$y = 3(x - 4)^2 + 39$$

7-27. Mr. Keis wrote the following problem on the board and told his class, *"No calculators please. Simplify. You have sixty seconds!"*

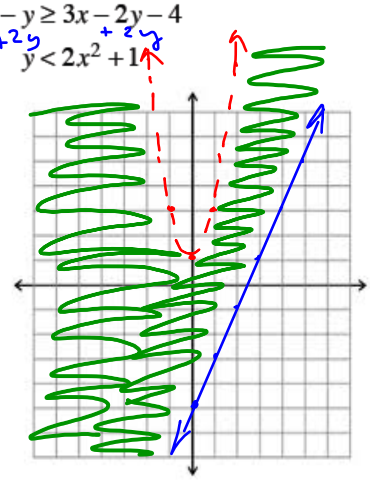
$$\left(\frac{13^{12}}{14^{23}}\right)\left(\frac{27^3}{13^{11}}\right)\left(\frac{2^{10}}{27^4}\right)\left(\frac{14^{22}}{13}\right)\left(\frac{27}{2^9}\right) = \frac{13^{12} \cdot 27^4 \cdot 2^{10} \cdot 14^{22}}{13^{12} \cdot 27^4 \cdot 2^9 \cdot 14^{23}} = \frac{2}{14} = \boxed{\frac{1}{7}}$$

Time yourself and simplify the expression. Did you meet the challenge?

7-28. Graph the system at right.

$$1 + x - y \geq 3x - 2y - 4 \quad +2y \quad +2y$$
$$y < 2x^2 + 1$$

$$1 + x + y \geq 3x - 4$$
$$-1 - x \qquad -x - 1$$
$$y \geq 2x - 5$$



7-29. Use your knowledge of shifting parent graphs to graph each equation below.

a. $y=-2(x-3)^2+4$

b. $y=\frac{1}{2}(x+2)^3-3$

c. $y=2|x-5|$

d. $y=\sqrt{x-2}-3$

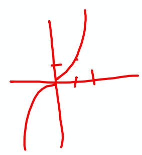
7-30. Find the x- and y-intercepts for the quadratic equation $y+3=8x^2-10x$.

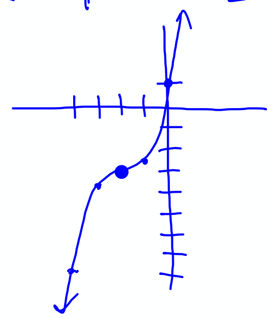
parent
$y=x^3$

x	y
-2	-8
-1	-1
0	0
1	1
2	8

$\to (h,k) \to (-2,-3)$

left 2 down 3
vertical compression $\frac{1}{2}$





30) $y=8x^2-10x-3$
$(4x+1)(2x-3)$

7-29. Use your knowledge of shifting parent graphs to graph each equation below.

a. $y=-2(x-3)^2+4$

b. $y=\frac{1}{2}(x+2)^3-3$

c. $y=2|x-5|$

d. $y=\sqrt{x-2}-3$

7-30. Find the x- and y-intercepts for the quadratic equation $y+3=8x^2-10x$.

$0=8x^2-10x-3$

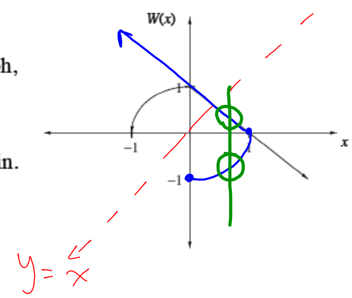
$(1x \quad)(8x \quad)$
$(2x \quad)(4x \quad)=0$

$1 \cdot 3$

7-31. A function $W(x)$ is sketched at right.

a. Make your own copy of the graph, and then sketch the graph of the inverse of $W(x)$.

b. Is the inverse a function? Explain.



7-32. Mary has an antique marble collection containing 40 marbles. She has five more red marbles than blue and twice as many red as green marbles. Write a system of equations to find the number of each color of marble.

Let r = # of red marbles

Let b = # of blue marbles

Let g = # of green marbles

① $r + b + g = 40$

$b + 5 = r$

$2g = r$

$b = r - 5$

$g = \frac{r}{2}$

① $r + r - 5 + \frac{r}{2} = 40$

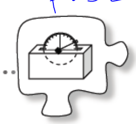
$\frac{2}{5} \cdot \frac{5}{2} r = \frac{\cancel{45}^{9}}{1} \cdot \frac{2}{\cancel{5}}$

$r = 18$

plug in to find g & b.

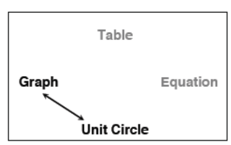
CP's: 7- # 33, 34 (own paper) p. 324

7.1.3 How are circles and sine graphs connected?



Unit Circle ↔ Graph

Throughout this course, you have used multiple representations (table, graph, equation, and situation) to solve problems, investigate functions, and justify conclusions. In Lesson 7.1.2 you found that a unit circle is one representation of a sine function. Today you will investigate the connections between the unit circle and its graph, as you build a deeper understanding of the sine function.



7-33. Draw a circle on your paper. Then draw a triangle that could represent René and Antonio's position on the wheel when *The Screamer* came to a sudden stop. Be sure to choose a different angle position from any of those you drew in problem 7-14.

a. Label the triangle with its height and its angle measure (from 0°).

b. Did any other riders have to climb the same distance to get to safety (up *or* down) as René and Antonio did? If so, draw the corresponding triangles and label them completely.

c. What is the relationship between these triangles? Work with your team to generalize a method for finding all of the other corresponding angles when you are given just one angle.

7-34. In problem 7-33, you used a unit circle to find the height of a seat on *The Screamer*. Could you use your graph of $y = \sin\theta$ instead to find the height?

a. Use the Lesson 7.1.3 Resource Page (also called a sine calculator) provided by your teacher to find the height of a seat that has rotated 130° from the starting platform.

b. Are there any other seats at exactly the same height? If so, indicate them on your resource page.

c. How can you use the symmetry of the graph to calculate which angles correspond to seats with the same height? Discuss this with your team and be prepared to share your strategies with the class.

d. For each of the following angles, use the sine calculator from the resource page to find the height at that angle and to find another angle with the same height. Then sketch a small unit circle, draw in each pair of angles, and label the heights.

i. 80° *ii.* 200° *iii.* 310°

HW: 7-

#36 ---> 44

Short Quiz Friday:

Combine rational expressions

Completing the Square